



# An orthopedic manual physical therapy fellowship training's impact on professional development, involvement, personal lives, and income – A survey study

Julie M. Whitman<sup>a,b</sup>, Mark Shepherd<sup>a,b</sup>, Brett Neilson<sup>b</sup>, T. J. Janicky<sup>c</sup>, William J. Garcia<sup>b,d</sup>, Seth Peterson<sup>e,f</sup> and Barbara J. Stevens<sup>a,b</sup>

<sup>a</sup>Orthopaedic Manual Physical Therapy Program, Bellin College, Green Bay, WI, USA; <sup>b</sup>Department of Physical Therapy, Evidence In Motion, Louisville, KY, USA; <sup>c</sup>Department of Physical Therapy, Active Life Physical Therapy, Baltimore, MD, USA; <sup>d</sup>Department of Physical Therapy, California State University, Sacramento, CA, USA; <sup>e</sup>Department of Physical Therapy, The Motive, Oro Valley, AZ, USA; <sup>f</sup>Arizona School of Health Sciences, A.T. Still University, Mesa, AZ, USA

## ABSTRACT

**Introduction:** Little research exists investigating the personal and professional outcomes of postprofessional physical therapy (PT) training. Therefore, the purpose of the current descriptive, web-based survey study was to determine self-reported outcomes from a postprofessional PT fellowship program, including graduate professional, educational, and research involvement; perceptions of the impact of training on clinical and professional attributes; changes in employment and income; and barriers to training.

**Methods:** Graduates of a part-time, hybrid-model, multisite orthopedic manual PT fellowship program were invited to complete the web-based survey. Descriptive data analyses were performed for all quantitative data, and responses to questions were analyzed and categorized into themes.

**Results:** Of the 77 fellowship graduates, 75 (97%) completed the survey. Graduates were involved in teaching; 43% (32/75) filled lead instructor roles in PT education programs. Further, 75% (57/75) were involved in research. The mean (SD) and median (range) increase in annual gross income was \$9560 (\$17,545) and \$2,500 (\$0–\$125,000), respectively. Perceived areas with the largest impact of training included clinical reasoning, patient-centered and evidence-based practice, and professionalism. Life balance and family commitments were frequent barriers during training.

**Discussion:** Graduates noted substantial perceived professional, clinical, and financial benefits to fellowship training. Limitations included lack of a control group and surveying participants from a single program. Future research should determine the influence that program and participant-related factors have on personal and professional lives of graduates and on clinical outcomes.

**Level of Evidence:** Descriptive survey, level 3.

## KEYWORDS

Education; manual therapy; fellowship; survey

## Introduction

The American Board of Physical Therapy Residency and Fellowship Education (ABPTRFE) defines fellowship training (FT) as a 'postprofessional planned learning experience comprised of a curriculum encompassing the essential knowledge, skills, and responsibilities of an advanced physical therapist within a defined area of subspecialty practice' [1]. As of February 2019, there were 52 fellowship programs accredited by the ABPTRFE, and 32 of them focused on orthopedic manual physical therapy (OMPT) [2]. Further, the ABPTRFE reports that over 1700 physical therapists (PTs) graduated from an accredited fellowship from 1999–2017 [3]. Although it is commonly believed that standardized postprofessional training such as FT may be superior to the traditional route of continuing education and professional development [4], little has been published

investigating the benefits of these programs during their 30-year history in the United States. Leaders in the profession have called for exploration of the benefits of residency and fellowship training for PTs [5–7] and for investigation of the potential factors that influence learning and outcomes, such as continued professional development and expertise [7,8]. Others have indicated a need to identify the outcomes of graduates' leadership and professional skills, teaching and learning strategies, and curriculum competencies [8].

Only a few studies have investigated the non-direct patient care outcomes of residency or fellowship training [9–12]. In 1999, Smith et al. [12] surveyed orthopedic PT residency graduates who reported enhanced clinical reasoning and clinical skills when taking on additional teaching roles after their training. Jones et al. [10]

investigated the professional development and leadership outcomes of PT residency graduates and reported they were more likely to continue to FT, obtain board certification, serve as clinical or academic instructors, and receive a higher annual income than PTs who did not graduate from residency programs. A recent qualitative survey of 13 OMPT fellowship graduates from a part-time, hybrid-model, multisite program found that they perceived improvements in time management, practice satisfaction, professional connectedness, active and open listening skills, professional evolution, and metacognition [11]. Briggs et al. [9] reported that employers of residency-trained and fellowship-trained PTs rated these employees higher in the domains of leadership, communication, clinical aptitude, teaching, scholarship, and evidence-based practice than colleagues who had similar professional experience.

To our knowledge, only one study directly examined whether completing FT results in superior clinical outcomes [13]. Rodeghero et al. [13] performed a retrospective study examining the differences in outcomes and efficiency (improvement per number of treatment sessions) between those with and without completion of a credentialed residency or fellowship program. Results showed that those with FT achieved more efficient care and greater overall functional improvement than residency and non-residency trained PTs [13]. Although additional quantitative research is still needed, Robertson and Tichenor [7] emphasized the need for additional quantitative and qualitative research in order to ‘fully paint the picture of the true outcomes and benefits of residency and fellowship education.’ (pg. 58).

Based on the scant information available in the literature regarding the impact of FT on graduates’ personal and professional lives, and in response to the call for additional quantitative and qualitative research regarding residency and fellowship education [7], we sought to describe graduate outcomes from a single postprofessional PT fellowship program. Specifically, we aimed to describe multiple types of educational outcomes, including graduate professional, educational, and research involvement; perceptions of the impact of FT on clinical and professional attributes; access to FT; and changes in employment and graduates’ annual income. We also sought to provide an initial description of the perceived barriers of PTs when completing FT.

## Methods

### Participants and training

For the current study, we recruited graduates of a multisite, hybrid, OMPT fellowship program. The program was credentialed by ABPTRFE and recognized by the American Academy of Orthopedic Manual Physical Therapists (AAOMPT). See Supplemental Appendix 1 for

curricular details and program requirements. All program graduates (N = 77) from the start of the program in 2009 through February 2017, when data collection for the current study was begun, were invited to participate. Though it is possible that more recent graduates may respond somewhat differently than those who graduated many years prior, we included all graduates in order to provide a comprehensive picture of graduate perceptions.

### Survey

For the current study, we specifically created an online survey based on studies evaluating outcomes of clinical residency programs [10,12] and on expert recommendation [7]. The survey (Supplemental Appendix 2) included questions about the impact of FT on professional attributes and skills, self-perception of professionalism, scholarly activities, and professional involvement. Participants also reported on the impact of training on salaries and annual gross income. Survey items asking about the impact of FT on professional attributes, skills, self-perception, and income were assessed on an 11-point Likert-like scale, where –5 was significant negative influence, 0 was no influence, and 5 was significant positive influence. We also assessed access to FT, including access to Fellow of the American Academy of Orthopedic Manual Physical Therapists (AAOMPT)-credentialed mentors and in-residence OMPT programs and whether the graduate would have pursued FT without access to a hybrid-model program. Optional open-ended questions asked how training impacted graduates professionally and personally. They also asked about perceived barriers to FT and about life situations and responsibilities that had to be balanced alongside the program. The survey required approximately 20–30 minutes to complete. SurveyMonkey software (SurveyMonkey, Inc., San Mateo, CA, [www.surveymonkey.com](http://www.surveymonkey.com)) was used to create the survey and gather data.

Six PTs participated in pilot testing of the online survey. The survey scored at an 8.8 grade level on the Flesch-Kincaid Grade Level Readability test [14] and had a Flesch Reading Ease [14] score of 42.3. The survey’s reading ease score indicated appropriateness for readers with a college-level education and beyond. As such, we considered the survey appropriate for our target population [15].

### Procedures

All study procedures were approved by the local institutional review board. Informed consent was obtained and the rights of the participants were protected. Participants were recruited through social media and e-mail. The beginning of the online survey contained information about the study and

informed consent to participate. To incentivize participation, 8 randomly selected respondents were offered 25 USD gift cards at completion of the study. Only 1 member of the research team, who was not the program director, had access to participant identities in order to send additional invitations as necessary and to contact participants awarded gift cards. Non-respondents to the initial invitation were contacted up to 3 additional times by telephone or e-mail at approximately 2-week intervals. The survey remained open for a 3-month period (February to April 2017). When the survey closed, the team member with access to the online survey results identified and downloaded the data into SPSS (IBM SPSS Statistics for Windows, version 24.0. Armonk, NY) for analysis.

### Data analysis

Descriptive analyses were used for participant demographics (eg, sex, age, years of clinical practice, highest academic degree) and for all closed-ended survey responses related to professional attributes (view of self, attributes, and knowledge), participation in professional activities and research (involvement in professional organizations, presentations, publications of research), employment information (current and past work experience), perceptions of clinical expertise (reasoning for clinical decisions), and reasons for selecting this particular program. Open-ended responses were analyzed using an inductive approach without predefined categories from the raw narrative data. Responses were analyzed by 2 team members (WG, BJS), who independently categorized the participant comments into themes. Any disagreement between themes was resolved by a third team member (JMW) until consensus was established. SPSS version 24.0 was used for all statistical analyses.

### Results

Seventy-seven graduates were invited to participate, and 75 (97% response rate) completed the survey. Most participants were male (55/75, 73.3%) with a mean (SD) age of 39.9 (7.8) years and 8.9 (7.4) years of clinical practice before entry to the FT program (Table 1). The mean (SD) time to complete the program was 32.1 (7.1) months. Participants worked in a variety of primary and secondary work positions, but orthopedics was the most common practice area of focus (69/75, 92.0%) (Table 2). Detailed demographic, employment, and practice characteristics are provided in Tables 1 and 2.

### Perceived impact of fellowship training on professional attributes and income

Mean scores for survey items related to perceived impact on professionalism, application of knowledge, and impact of FT on patient outcomes ranged from 3.7 to 4.7 points (Table 3). The highest mean (SD) scores were reported for viewing oneself as a professional (4.7 [0.7] points). Mean (SD) impact on confidence in mentoring ranged from 3.4 (3.2) points for mentoring fellows-in-training to 4.3 (2.0) points for mentoring peers in the clinic or community. Full results for perceived impact of fellowship training on professional attributes are reported in Table 3. Mean scores for impact on clinical reasoning skills in all phases of the care process ranged from 3.9 to 4.7 points (Table 4). Impact on technical skills varied from 3.6 to 4.4 points, except for application of modalities (mean [SD] = 0.7 [1.8]). The increase in annual gross income for all graduates who completed the survey was as follows: 1) mean (SD) of 9560 USD (\$17,545); 2) median (range) of 2500 USD (\$0-125,000). The majority of graduates (44/75, 59.0%) augmented their annual income with additional work (mean [SD] = 9020 USD [\$11 123]), and 20% (15/75) received raises in gross salary (\$6100 [\$6054]).

### Perceived impact of fellowship training on professional, educational, and research involvement

Respondents were involved as members and leaders of professional associations and in scholarly work and educational activities (Tables 5 and 6). Almost all graduates were members of the American Physical Therapy Association (APTA) (72/75, 96.0%) and the AAOMPT (73/75, 97.3%), and 22.7% (17/75) had held official positions in these organizations (board or committee member) (Table 5). Additionally, 24.0% (18/75) had served in their state chapter or district as a state delegate, board member, or committee member. Most (57/75, 76.0%) were involved in research during fellowship or since graduation (Table 6). More than a quarter (21/75, 28.0%) had published in peer-reviewed journals and professional texts, and conducted professional platform presentations (24/75, 32.0%), presented posters (23/75, 30.7%), or were invited speakers at national (15/75, 20.0%) and district or state level (28/75, 37.3%) professional meetings.

Graduate involvement in education was a common finding in this study. After FT, 42.7% (32/75) were lead instructors in entry-level postprofessional PT programs, and 53.3% (40/75) were lead instructors for continuing education seminars (Table 6). About half had developed curricular content for entry-level

**Table 1.** Demographic characteristics of graduates of a postprofessional physical therapy fellowship training program (N = 75).

Demographic characteristic	No. (%)	Mean (SD)	Median (range)
Sex			
Male	55 (73.3)		
Female	20 (26.7)		
Age, y			
Current age		39.9 (7.8)	37 (29–65)
On entry to program		35.7 (7.5)	35 (25–60)
Years clinical practice			
Current total		14.0 (8.0)	11 (3–38)
Current total in primary orthopedic/sports setting		13.0 (7.2)	11 (3–38)
On starting fellowship		8.9 (7.4)	6 (0–31)
First professional degree			
Baccalaureate	13 (17.3)		
Master's	23 (30.7)		
Doctorate	39 (52.0)		
Highest academic degree			
Baccalaureate	0 (0)		
Entry-level master's	1 (1.3)		
Postprofessional master's	1 (1.3)		
Clinical doctorate in physical therapy (DPT)	68 (90.7)		
Terminal doctorate (PhD, DSC, etc)	5 (6.7)		
Year of fellowship program graduation			
2010	3 (4.0)		
2011	3 (4.0)		
2012	10 (13.3)		
2013	7 (9.3)		
2014	11 (14.7)		
2015	18 (24.0)		
2016	21 (28.0)		
2017	2 (2.7)		
Relationships during program requiring time and attention			
Significant other during >50% of program	73 (97.3)		
Children at home elementary age or younger	33 (44.0)		
Children at home junior high or older	10 (13.3)		
Caring for aging parents	3 (4.0)		
Other family situations*	15 (20.0)		

\*Examples were spouse with cancer, parent death, newborn child, moving, stressful pregnancy, pregnancy and delivery of multiple children, bought/sold home, sick children, child in intensive care unit, working on PhD, and military move. Abbreviations: DSC, doctor of science; PhD, doctor of philosophy; SD, standard deviation.

(40.0%, 30/75) or postprofessional PT education online and onsite lab courses (57.3%, 44/75). Clinical mentorship was a reported for many; 89.3% (67/75) reported involvement as mentors for peers in clinical practice, entry-level DPT students (from 65 programs), residents (from 23 credentialed programs), or fellows-in-training (from 9 credentialed programs) (Table 5). Most (53/75, 70%) reported that FT positively influenced their confidence in teaching and mentoring.

Graduates reported 5-year professional goals (Table 5), including involvement in teaching in entry-level (24/75, 32.0%) and postprofessional (47/75, 62.7%) PT programs, presenting at conferences (56/75, 74.7%), disseminating research in peer-reviewed journals (36/75, 48.0%), expanding involvement with the APTA or AAOMPT (47/75, 62.7%), obtaining a terminal doctoral degree (40/74, 53.3%), and continuing research activities (43/75, 57.3%).

### Access to fellowship training and program selection

Table 7 provides data related to access to FT. Graduates (46/75, 61.3%) would not have pursued FT if a hybrid

learning program were unavailable, while 25% (19/75) would have but only if a geographic relocation was not required. Approximately half (35/75, 46.7%) indicated the nearest in-residence program was more than a 2-hour drive away, and only about half had access to a qualified mentor within a 1-hour drive (39/75, 52.0%). Over half of the graduates noted that they chose this program for the following reasons: 'I could maintain work and a salary while going through the program' (94.7%, 71/75), 'I respected the faculty' (93.3%, 70/75), 'I liked the clinical reasoning model taught' (74.7%, 56/75), 'I liked the research-based approach' (73.3%, 55/75), and 'I was unwilling or unable to relocate' (66.7%, 50/75) (Supplemental Appendix 3).

### Perceived impact of fellowship training on professional and personal life

Of 75 completed surveys, 67 graduates (89%) responded to the optional open-ended questions about how FT impacted them professionally and personally. Nine themes emerged – expertise, clinical reasoning, evidence-based practice, teaching, communication, traits/values, professionalism, collaboration, and difficulties.

**Table 2.** Primary and secondary professional positions of program graduates before and after the fellowship program (N = 75).

Survey Item	Before	After
Primary position		
Staff physical therapist	33 (44.0)	13 (17.3)
Clinical specialist, senior staff physical therapist	12 (16.0)	16 (21.3)
Clinical supervisor or director	15 (20.0)	10 (13.3)
Partner in a physical therapy practice or business	2 (2.7)	9 (12.0)
Sole owner of a PT practice or business	6 (8.0)	6 (8.0)
Academic faculty member	5 (6.7)	9 (12.0)
Clinical educator (entry-level or postprofessional)	0 (0)	3 (4.0)
Academic administrator (first-professional or postprofessional)	0 (0)	4 (5.3)
Director of physical therapy education program	0 (0)	1 (1.3)
Clinical researcher	2 (2.7)	1 (1.3)
Other (retired, director of rehabilitation center of expertise, hospital transition specialist)	0 (0)	3 (4.0)
Primary position geographic location		
Uniformed health, military, or veteran's association	NA	4 (5.3)
Metropolitan or urban	NA	36 (48.0)
Suburban	NA	26 (34.7)
Rural or remote	NA	12 (16.0)
Other (mountain resort, professional sports, small city, retired, non-clinical academics)	NA	5 (6.7)
Primary position type of facility		
Hospital inpatient	1 (1.3)	1 (1.3)
Hospital outpatient	17 (22.7)	16 (21.3)
Hospital emergency care	1 (1.3)	1 (1.3)
Outpatient private practice	46 (61.3)	32 (42.7)
Physician-owned PT practice	2 (2.7)	1 (1.3)
Outpatient rehabilitation center	3 (4.0)	3 (4.0)
Academic institution (teaching)	4 (5.3)	12 (16.0)
Academic student health clinic	0 (0)	1 (1.3)
Military/uniformed health	1 (1.3)	1 (1.3)
Other (retired; hospital system with inpatient, outpatient, and home care; community nonprofit services; university outpatient student health; sports facility; home office administrative)	1 (1.3)	6 (8.0)
Clinical practice area of focus		
Orthopedics	NA	69 (92.0)
Sports	NA	19 (25.3)
Administration/business	NA	11 (14.7)
Women's health/pelvic health	NA	1 (1.3)
Chronic pain	NA	23 (30.7)
Neurologic rehabilitation	NA	1 (1.3)
Emergency care	NA	1 (1.3)
General practice (no focus area)	NA	1 (1.3)
Other (retired, concussion, primary care PT, academic institution with no clinical appointment, additional academic appointment postprofessional residency)	NA	5 (6.7)
Secondary positions held	10 (13.3)	30 (40.0)
Staff physical therapist	8 (10.7)	4 (5.3)
Clinical specialist, senior staff physical therapist	0 (0)	2 (2.7)
Clinical supervisor or director	0 (0)	1 (1.3)
Partner in a PT practice or business	0 (0)	0 (0)
Sole owner of a PT practice or business	1 (1.3)	4 (5.3)
Academic faculty member	1 (1.3)	3 (4.0)
Academic administrator (first-professional or postprofessional)		3 (4.0)
Director of physical therapy education program	0 (0)	2 (2.7)
Clinical educator (first-professional or postprofessional)	0 (0)	8 (10.7)
Clinical researcher	0 (0)	0 (0)
Other (canine conditioning, CEO of physical therapy company, director of education and mentoring)		3 (4.0)
Secondary position type of facility		
Hospital inpatient	3 (4.0)	0 (0)
Hospital outpatient	1 (1.3)	4 (5.3)
Hospital emergency care	0 (0)	0 (0)
Outpatient private practice	2 (2.7)	11 (14.7)
Physician-owned PT practice	0 (0)	0 (0)
Outpatient rehabilitation center	0 (0)	0 (0)
Academic institution	1 (1.3)	8 (10.7)
Research center	0 (0)	1 (1.3)
Military/uniformed service	0 (0)	0 (0)
Fitness center	0 (0)	1 (1.3)
Professional education company	0 (0)	3 (4.0)
Home health agency, extended care, or skilled nursing	3 (4.0)	1 (1.3)
Other (postprofessional continuing education teaching, office, fitness center, public health service rural medical clinic, postprofessional program in private practice and hospital clinics)	0 (0)	6 (8.0)
Weekly hours spent in direct patient care	39.0 (8.9)	26.9 (14.6)
	40.0	30.0
	(8–60)	(0–50)

Data are reported as no. (%) except for weekly hours spent in direct patient care, which is reported as mean (SD) and median (range).

Abbreviations: CEO, chief executive officer; NA, not applicable; PT, physical therapy; SD, standard deviation.



**Table 3.** Perceived impact of the fellowship program on professional attributes and outcomes for program graduates (N = 75).

Survey Item	Mean (SD)	Median (Range)
View of self as a professional	4.7 (0.7)	5 (2–5)
Impact on professional attributes		
Demonstration of high level of communication skills with colleagues	4.3 (1.0)	5 (1–5)
Demonstration of high-level communication and collaboration skills with multidisciplinary colleagues	3.7 (1.2)	5 (0–5)
Commitment to lifelong learning	4.4 (1.1)	5 (0–5)
Commitment to investing or giving back to the profession (legislative or professional associations)	3.8 (1.3)	4 (0–5)
Commitment to teaching/leading peers in the clinical setting or professional community	4.7 (0.7)	5 (0–5)
Commitment to using one's unique professional skills to serve the local community	4.0 (1.3)	4 (0–5)
Impact on professional knowledge		
Evidence-based practice	4.4 (1.1)	5 (0–5)
Patient-centered practice	4.5 (1.0)	5 (0–5)
Biopsychosocial model of clinical practice	4.5 (0.9)	5 (2–5)
Impact on application of knowledge		
Evidence-based practice	4.5 (0.9)	5 (0–5)
Patient-centered practice	4.6 (0.9)	5 (0–5)
Biopsychosocial model of clinical practice	4.6 (0.8)	5 (2–5)
Influence of fellowship training on patient outcomes		
Ability to achieve optimal outcomes	4.5 (0.8)	5 (1–5)
Ability to treat efficiently	4.4 (0.9)	5 (1–5)
Impact on confidence in teaching and mentoring		
Peers in clinical practice or the community	4.3 (2.0)	5 (1–5)
Entry-level DPT students	4.2 (2.1)	5 (0–5)
Residents	4.01 (2.7)	5 (0–5)
Fellows-in-training	3.4 (3.2)	5 (0–5)

Data are based on an 11-point Likert-like scale where –5 = significant negative influence, 0 = neutral, and 5 = significant positive influence.

Abbreviation: DPT, doctorate in physical therapy; SD, standard deviation.

**Table 4.** Perceived impact of fellowship training on clinical reasoning and application of selected intervention techniques for program graduates (N = 75).

Area of impact	Mean (SD)	Median (range)
Clinical reasoning in the patient history		
Conducting a focused and skilled patient interview	4.7 (0.9)	5 (–1–5)
Establishing hypotheses, including recognition of common clinical syndromes	4.6 (0.9)	5 (1–5)
Asking appropriate questions and evaluating the need for medical referral/consultation, referral to additional healthcare provider	4.6 (0.9)	5 (0–5)
Planning appropriate physical exam based on patient presentation	4.7 (0.9)	5 (0–5)
Establishing a good relationship/rapport with the patient	4.3 (1.1)	5 (0–5)
Clinical reasoning in the physical exam		
Conducting a skilled physical examination specifically tailored to the patient's complaint, diagnosis, and presentation	4.6 (0.8)	5 (1–5)
Performing appropriate tests to evaluate the need for medical referral/consultation, referral to additional healthcare provider	4.5 (0.8)	5 (0–5)
Performing appropriate tests to establish a physical therapy diagnosis	4.5 (0.8)	5 (1–5)
Establishing clinical findings for reassessment of the effectiveness of treatment interventions that are meaningful to the patient	4.7 (0.6)	5 (3–5)
Synthesizing findings from physical exam to select appropriate interventions	4.6 (0.8)	5 (1–5)
Clinical reasoning in the intervention process		
Selecting and performing the most appropriate interventions	4.5 (0.8)	5 (2–5)
Reassessing the patient's status to progress their treatment appropriately within session and over the course	4.6 (7.9)	5 (1–5)
Selecting and instructing the patient in the most appropriate home exercise program	4.3 (1.0)	5 (1–5)
Adjusting your communication content and delivery method based on the patient needs	5.4 (1.0)	5 (1–5)
Clinical reasoning in discharge planning		
Establishing a prognosis	5.2 (0.9)	5 (1–5)
Clearly communicating the prognosis to the patient and other key stakeholders (family, caregiver, referring physician, etc.)	3.9 (1.2)	5 (0–5)
Preparing for discharge and prevention of recurrence from the initial evaluation and throughout the course of care	4.0 (1.1)	4 (1–5)
Impact on technical skills		
Manual therapy non-thrust techniques	4.4 (1.0)	5 (1–5)
Manual therapy thrust techniques	4.4 (0.8)	5 (1–5)
Therapeutic exercise prescription	3.6 (1.8)	4 (6–11)
Modalities	0.7 (1.8)	0 (–4–5)
Targeted home exercise program and self-management strategies	3.8 (1.3)	4 (0–5)
Patient education	4.2 (1.0)	5 (2–5)

Data are based on an 11-point Likert-like scale where –5 = significant negative influence, 0 = neutral, and 5 = significant positive influence.

Abbreviation: SD, standard deviation.

Metacognition and clinical skills were identified as characteristics of expertise. Graduates identified FT as having a positive impact on clinical reasoning, including both

critical thinking and decision-making, and on confidence with teaching. For professionalism and collaboration, graduates indicated they had a broader view of the

**Table 5.** Leadership and professional involvement for program graduates (N = 75) after graduation.

Survey item	No. (%)
National organization membership and leaderships	
APTA membership	72 (96.0)
AAOMPT member	73 (97.3)
Served in AAOMPT or at the national or section level of the APTA	17 (22.7)
AAOMPT executive	2 (2.7)
AAOMPT committee chair	2 (2.7)
AAOMPT committee member	6 (8.0)
AAOMPT special interest group chair	1 (1.3)
APTA board	1 (1.3)
APTA committee	3 (4.0)
APTA section committee	5 (6.7)
ABPTRFE position	2 (2.7)
Exam item writer for NPTE or board specialty exam	3 (4.0)
Other (APTA Human Movement Summit delegate, APTA media corps)	2 (2.7)
State chapter of district level of the APTA	18 (24.0)
State delegate	6 (8.0)
State chapter board of directors	4 (5.3)
State chapter committee	11 (14.7)
District board	5 (6.7)
District committee	5 (6.7)
State committee task force legislative efforts	8 (10.7)
Other (mentor volunteer for state new graduate PT program)	1 (1.3)
Clinical mentorship of peers	67 (89.3)
Entry-level DPT students	55 (73.3)
Residents from same organization completed FT with	33 (44.0)
Residents from other programs	24 (32.0)
Fellows-in-training from same organization completed FT with	42 (56.0)
Fellows-in-training from other programs	18 (24.0)
Colleagues in primary clinic	52 (69.3)
Other unspecified	2 (2.7)
Professional aspirations (current to next 5 years)	
Teach continuing education courses	55 (73.3)
Teach in a postprofessional PT education program	47 (62.7)
Teach as adjunct faculty in an entry-level PT education program	44 (58.7)
Teach as ranked faculty in an entry-level PT education program	24 (32.0)
Present at conferences	56 (74.7)
Disseminate research in peer-reviewed journals	36 (48.0)
Perform a clinical administrator role	17 (22.7)
Perform a hospital administrator role	3 (4.0)
Start or continue in private practice ownership	24 (32.0)
Expand my current private practice ownership	16 (78.7)
Expand involvement in professional organizations (APTA, AAOMPT)	47 (62.7)
Obtain a terminal doctoral degree (DSc, PhD)	40 (53.3)
Participate in a case report or case series	44 (58.7)
Participate in higher-level clinical research	43 (57.3)
Other (run for public office, unspecified research)	2 (2.7)

Abbreviations: AAOMPT, American Academy of Orthopedic Manual Physical Therapists; ABPTRFE, American Board of Physical Therapy Residency and Fellowship Education; APTA, American Physical Therapy Association; DPT, doctor of physical therapy; DSc, doctor of science; FT, fellowship training; NPTE, National Physical Therapy Exam; PhD, doctor of philosophy; PT, physical therapy.

profession after training and that they had developed a network of colleagues to consult and collaborate with. Graduates indicated improved communication skills in their professional and personal lives. Enhanced humility, commitment, confidence, and life-long learning skills were traits and values identified as positively impacting graduates professionally and personally. Life balance, family commitments, and marital strain were difficulties experienced during FT. Selected representative written responses related to each theme are provided in Supplemental Appendix 4.

## Discussion

The current study described the graduate outcomes from a single postprofessional OMPT fellowship program. We specifically investigated graduate

perceptions of the impact of their FT on various professional attributes, professional development and involvement, employment, and income. We also investigated perceived barriers to FT and the perceived personal impact of FT. To our knowledge, the current study is the first to describe the professional impact of FT on the lives and careers of postprofessional fellowship graduates for this specific type of program.

Graduates were overwhelmingly positive about the impact of FT on their professional and personal lives. Their self-perception as PT professionals was increased, and they reported an extensive impact of FT on their clinical skills and professional attributes and on their personal lives, communication skills, and relationships. Further, graduates reported widespread involvement in research, scholarship, teaching, and professional leadership and service roles; and they indicated an

**Table 6.** Research and scholarship activities for program graduates (N = 75) during or after graduation.

Survey item	No. (%)
Research involvement by type of study or activity	57 (76.0)
Case reports/case series	36 (48.0)
Qualitative/quantitative survey study	19 (25.3)
Randomized trials	15 (20.0)
Systematic reviews/meta-analysis	9 (12.0)
Clinical guidelines	10 (13.3)
Editorial in peer-reviewed publications	4 (5.3)
Other ( <i>JOSPT</i> MSK Imaging, observational cohort study, literature review)	3 (4.0)
Research activities by specific role in research	50 (66.7)
Design	18 (24.0)
Grant writing	10 (13.3)
Data collection	39 (52.0)
Manuscript writing	32 (42.7)
Statistical analysis	9 (12.0)
Types of publications or presentations	61 (81.3)
Publications (case studies, book chapters, articles on clinical topics, peer reviewed articles)	21 (28.0)
Platform presentations at professional conferences	24 (32.0)
Poster presentations at professional conferences	23 (30.7)
Development of curriculum (entry-level/postprofessional)	30 (40.0)
Development of educational materials (online/onsite)	44 (57.3)
Professional scholarly activities	62 (82.7)
Lead instructor of a continuing education seminar	40 (53.3)
Guest lecturer or lab assistant in a professional or postprofessional PT education program	54 (72.0)
Lead instructor in a professional or postprofessional PT program	32 (42.7)
Invited speaker at a national level meeting	15 (20.0)
Invited speaker at a district or state level meeting	28 (37.3)
Other (community education)	1 (1.3)

Abbreviations: *JOSPT*, Journal of Orthopedic and Sports Physical Therapy; MSK, musculoskeletal; PT, physical therapy.

**Table 7.** Access to training for program graduates (N = 75).

Survey item	No. (%)
Nearest FAAOMPT mentor (while in program)	
Within my organization	21 (28.0)
Within my town/city	4 (5.3)
Within a 30-minute drive	8 (10.7)
Within a 1-hour drive	6 (8.0)
Within a 2-hour drive	10 (13.3)
Greater than a 2-hour drive	21 (28.0)
Other	5 (6.7)
Nearest in-residence OMPT fellowship program	
Within my organization	3 (4.0)
Within my town/city	5 (6.7)
Within a 30-minute drive	3 (4.0)
Within a 1-hour drive	3 (4.0)
Within a 2-hour drive	7 (9.3)
Greater than a 2-hour drive	35 (46.7)
Do not know	15 (20.0)
Other	4 (5.3)
Would you have attended a credentialed fellowship program if you did not have access to hybrid learning fellowship program?	
No, I would not have pursued fellowship training	46 (61.3)
Yes, only if it did not require relocation	19 (25.3)
Yes, even if it did require relocation	3 (4.0)
I am not sure	7 (9.3)

Abbreviations: FAAOMPT, Fellow of the American Academy of Orthopedic Manual Physical Therapists; OMPT, orthopedic manual physical therapy.

interest in continuing professional development in these areas in the near future.

Graduates were positive about the impact of training on their communication skills and on their clinical skills, especially in clinical reasoning. These findings are similar to those of Smith et al. [12], where residency graduates rated the clinical reasoning process as the most valuable skill obtained during their program. Previous research has also shown that clinicians with FT have better adherence to clinical practice guidelines [16], achieve better efficiency and

effectiveness in their clinical outcomes [13], and are rated by employers higher than residency-trained employees in the area of clinical aptitude [9]. In another study, MacPherson et al. [17] identified reported gains in self-awareness and metacognition in fellowship graduates through qualitative methods, and these gains extended into perceived improvements in the graduates' personal lives. Fellowship programs generally emphasize reflection and deliberate practice, and the program of the current study in particular devotes extensive resources to developing



the reasoning and communication skills of each fellow-in-training (Supplemental Appendix 1). Reflection and deliberate practice have been associated with the development of domain expertise [18,19], which may be one explanation for the results of our study and other studies.

Nearly 90% of graduates were involved in entry-level and postprofessional clinical mentorship, including teaching in clinical programs outside those affiliated with the fellowship program. Interestingly, 11% of graduates transitioned into formal teaching roles by graduation, while the number of graduates practicing full-time in outpatient orthopedics declined. It is unclear why this occurred, but graduates could have used the OMPT fellowship program as an entry to faculty roles. In the program currently studied, fellows-in-training participate in a variety of formal teaching assistant roles in online and live classrooms or laboratory settings. These experiences may have increased confidence in teaching and desire to continue teaching after graduation. Others have found similar results. For example, Jones et al. [10] found similar increases in professional and postprofessional teaching roles in a sample of orthopedic PT residency graduates [20], and Briggs et al. [9] found that employers rated employees with residency training or FT higher than experience-matched colleagues in the domain of teaching.

Graduates were required to be members of the APTA and AAOMPT during our program, and they remained active in these associations. After graduation, 96% were members of the APTA and the AAOMPT, approximately one-fifth held official positions in those organizations, and about the same number were involved at the state or district level. Further, most wanted to expand their involvement in professional organizations in the next 5 years, which suggested a commitment to the profession and desire to serve. Similarly, Smith et al. [12] found that 80% of residency graduates maintained APTA membership; about 30% of PTs overall maintain membership [21].

The majority (76%) of graduates in our study had participated in scholarly activity, including nearly one-third with peer-reviewed journal or text publications or with presentations at professional meetings. This scholarly activity is higher than that reported for PT orthopedic residency graduates [12] but similar to that of medical graduates in a neurosurgical oncology residency program [17]. Our findings may have resulted from a number of factors, such as entrance of highly motivated students into the program, a greater understanding of the literature, growth in professional critical review and writing skills during the program, increased motivation to contribute to the literature, and successful modeling and mentoring of the research process by fellowship faculty. Interestingly, the majority of the graduates intended to participate

in clinical research, publish in peer-reviewed journals, and present at professional conferences in the next 5 years, suggesting that graduates were driven to grow and contribute to professional scholarship.

Most students pursuing a career in healthcare accumulate student loan debt [22]. Graduates of professional degree programs, such as PTs, represent only 10% of those with graduate degrees but represent 42% of those with over 150 USD 000 in student loan debt [4]. From 2007 to 2016, the cost of PT education has increased 2.3 to 3.1 times more quickly than growth in entry-level salaries, adding to the student debt problem [22]. Despite concerns about the cost of PT education, an APTA task force recently reported students may be unprepared for clinical practice in a specialty area and recommended postgraduate residency training for all PTs [23]. Understandably, critics of widespread postgraduate training in PT have cited student debt as a concern [24]. In the current study, graduates reported a mean increase of 9560 USD and a median increase in their annual gross income, which was about a 10% increase from the current median national salary for PT [25]. Although program costs vary, this increase in mean salary reported by program graduates would essentially compensate for most fellowship program tuitions in less than 2 years of graduation. Using a more conservative median increase of 2,500 USD, a graduate would still compensate for most fellowship tuitions within 5–6 years of graduation. A favorable influence of postgraduate training on salary was also reported by 76% of orthopedic residency graduates in a study by Smith et al. [12]. However, it is unclear whether postgraduate training will continue to be economical or whether more widespread postgraduate education would affect this outcome.

In 2016–2017, ABPTRFE reported 519 available positions in OMPT fellowships, but only 354 positions were filled [26], which suggests an excess of available positions in OMPT fellowship programs in the United States. In the current study, the majority of graduates indicated that they would not have pursued FT had a hybrid-model been unavailable, and 25% would have pursued FT only if relocation was not required. A potential explanation for this seemingly contradictory finding is that not all motivated clinicians have reasonable access to in-residence training and/or qualified mentors. In our study, only one-third of participants had appropriately credentialed mentors available in their organizations or towns, and only 14% had in-residence programs within a 30-minute driving distance. Further, almost all participants reported having a significant other during FT, almost half had children at home, and many had family situations that required time and attention during their training. Although many reasons related to the faculty and the curriculum were noted by graduates as a rationale for selecting our fellowship program, almost 95% cited the ability to maintain work and continue

receiving a salary as one driver for program selection. A hybrid, part-time program enables motivated PTs to continue to work and earn a salary while pursuing FT.

## Limitations

The current study had several limitations. Although the level of perceived improvement of OMPT fellowship graduates is important to understand, questions requiring a self-appraisal are inherently biased. Respondents may have answered favorably to survey questions knowing that this reflected the program they graduated from. Being that the survey study only targeted graduates of this program, we did not collect similar data on those that have dropped out of FT. In addition, the current study cannot show a cause and effect relationship between FT and the observed outcomes. For example, it is possible that more motivated PTs participated in FT and, therefore, would have the same degree of achievement regardless of training. Many graduates obtained board certification during the FT, which may impact clinical efficiency [20]. Graduate years of experience could also be a confounder and may have impacted clinical outcomes [7]. Although a comparison group was used in previous studies to better judge the impact of postprofessional training, no such group was used in the current study.

Another limitation is that graduates from a single OMPT fellowship program over a defined period of time were surveyed. Further, our program is a part-time, hybrid-model, multisite fellowship. A recent publication by Hartley et al. [27] identified several program-level factors that positively influenced graduate outcomes for PT residency programs. In that study, programs that were a single site or multisite facility, provided live instruction, charged no tuition, and paid residents at or above 70% of a full-time salary were more likely to have their participants complete the program, pass board examinations, and become board certified [27]. Interestingly, the program-level factors identified by Hartley et al. [27] are in sharp contrast to the FT program included in the current study. There were different research designs, assessed outcomes, and levels of training in these 2 studies that prevent direct comparisons, but the results of both studies suggest the need for future research investigating the impact of various program-level factors on programmatic outcomes. Current accredited fellowship programs have a robust diversity in terms of format and delivery model, treatment philosophy, and clinical reasoning models. Therefore, results of the current study may not be generalizable to other OMPT fellowship programs, other types of fellowships, or residency programs.

## Conclusion

Results of the current study suggested a substantial perceived impact of part-time, hybrid, multisite OMPT fellowship training on the professional development and clinical skills of PTs. Graduates were extensively involved in teaching and mentoring, research, and professional leadership activities; and they reported increased annual income. Most would not have been able to complete FT if a hybrid-model program had been unavailable. Limitations included the lack of a control group and a lack of inclusion of graduates from programs that use other educational models. Future research should investigate the influence of program, mentor, and clinician-related factors on graduate outcomes.

## Disclosure statement

The authors declare that we have no financial disclosures or conflicts of interest to report.

## Notes on contributors

**Dr. Julie M. Whitman** is the former program director of Bellin College's Orthopaedic and Manual Physical Therapy Fellowship and Doctorate of Science in Physical Therapy programs. She has 40+ peer-reviewed manuscripts, and over 30 published abstracts in the areas of orthopaedics and manual physical therapy.

**Dr. Mark Shepherd** is the program director of Bellin College's Orthopaedic and Manual Physical Therapy Fellowship program. He serves as faculty with Evidence in Motion. He is a fellow of the American Academy of Orthopaedic Manual Physical Therapy.

**Dr. Brett Neilson** is the program director of Evidence in Motion's tDPT and Therapeutic Pain Specialist programs. He is a fellow of the American Academy of Orthopaedic Manual Physical Therapy.

**Dr. T. J. Janicky** is a physical therapist at Active Life and Sports PT. He is a fellow of the American Academy of Orthopaedic Manual Physical Therapy. He serves as faculty with Evidence in Motion.

**Dr. William J. Garcia** is a full-time Assistant Professor in the Physical Therapy program at Sacramento State. He is a fellow of the American Academy of Orthopaedic Manual Physical Therapy.

**Dr. Seth Peterson** is the founder of The Motive Physical Therapy Specialists in Oro Valley, AZ. He is adjunct faculty in the Physical Therapy program at A.T. Still University. He is a fellow of the American Academy of Orthopaedic Manual Physical Therapy.

**Dr. Barbara J. Stevens** is faculty for Bellin College's Orthopaedic and Manual Physical Therapy Fellowship program. She serves as faculty with Evidence in Motion. She is a fellow of the American Academy of Orthopaedic Manual Physical Therapy.

## References

- [1] American Board of Physical Therapy Residency and Fellowship Education. ABPTRFE: about fellowships [Internet]. Alexandria (VA): American Physical Therapy Association; 2019 [updated 2018 Nov 29; cited 2019 Jan 30]. Available from: <http://www.abptrfe.org/ForParticipants/AboutFellowships/>
- [2] American Board of Physical Therapy Residency and Fellowship Education. Online directory of programs [Internet]. Alexandria (VA): American Physical Therapy Association; 2019c [cited 2019 Jan 30]. Available from: <https://accreditation.abptrfe.org/#/directory>
- [3] American Board of Physical Therapy Residency and Fellowship Education [Internet]. Alexandria (VA): American Physical Therapy Association; 2019c [cited 2019 Jan 30]. Available from: <http://www.abptrfe.org/home.aspx>
- [4] Cleland JA, Fritz JM, Brennan GP, et al. Does continuing education improve physical therapists' effectiveness in treating neck pain? A randomized clinical trial. *Phys Ther*. 2009;89(1):38–47.
- [5] Hartley G. Postgraduate residency training for physical therapists: its role in contemporary practice. *HPA Resour*. 2006;6(2):1,3–4.
- [6] Kulig K. Residency education in every town: is it just so simple? *Phys Ther*. 2014;94(1):151–161.
- [7] Robertson EK, Tichenor CJ. Postprofessional cartography in physical therapy: charting a pathway for residency and fellowship training. *J Orthop Sports Phys Ther*. 2015;45(2):57–60.
- [8] Furze JA, Tichenor CJ, Fisher BE, et al. Physical therapy residency and fellowship education: reflections on the past, present, and future. *Phys Ther*. 2016;96(7):949–960.
- [9] Briggs MS, Whitman J, Olson-Kellogg B, et al. Employer perceptions of physical therapists' residency and fellowship training: insights for career development planning. *J Phys Ther Educ*. 2019;33(1):40–48.
- [10] Jones S, Bellah C, Godges JJ. A comparison of professional development and leadership activities between graduates and non-graduates of physical therapist clinical residency programs. *J Phys Ther Educ*. 2008;22(3):85–88.
- [11] MacPherson KL, Shepherd M, Everett JC, et al. Perceptions of the professional and personal impact of hybrid fellowship training: a qualitative study. *J Man Manip Ther*. 2019;27(2):99–108.
- [12] Smith KL, Tichenor CJ, Schroeder M. Orthopaedic residency training: a survey of the graduates' perspective. *J Orthop Sports Phys Ther*. 1999;29(11):635–651.
- [13] Rodeghero J, Wang YC, Flynn T, et al. The impact of physical therapy residency or fellowship education on clinical outcomes for patients with musculoskeletal conditions. *J Orthop Sports Phys Ther*. 2015;45(2):86–96.
- [14] Readable. Test your readability [Internet]. Brighton (UK): Added Bytes; 2011c-2019 [cited 2019 Jan 30]. <https://readable.com/text/>
- [15] Flesch R. How to write plain English. New York (NY): HarperCollins; 1979.
- [16] Ladeira CE, Cheng MS, da Silva RA. Clinical specialization and adherence to evidence-based practice guidelines for low back pain management: a survey of US physical therapists. *J Orthop Sports Phys Ther*. 2017;47(5):347–358.
- [17] Jensen R, O'Rourke D, Warnick R, et al. Resident training in neurosurgical oncology: results of the survey of North American training programs by the AANS/CNS Section on Tumors. *J Neurooncol*. 2006;77(3):241–246.
- [18] Ericsson KA, Krampe RT, Tesch-Römer C. The role of deliberate practice in the acquisition of expert performance. *Psychol Rev*. 1993;100(3):363–406.
- [19] Jensen GM, Gwyer J, Shepard KF. Expert practice in physical therapy. *Phys Ther*. 2000;80(1):28–43.
- [20] Hart DL, Dobrzykowski EA. Influence of orthopaedic clinical specialist certification on clinical outcomes. *J Orthop Sports Phys Ther*. 2000;30(4):183–193.
- [21] American Physical Therapy Association. Membership matters: FAQ about APTA membership [Internet]. Alexandria (VA): American Physical Therapy Association; 2019c [cited Jan 2019 30]. Available from: <http://www.apta.org/MembershipMatters/FAQ/>
- [22] Shields RK, Dudley-Javoroski S. Physiotherapy education is a good financial investment, up to a certain level of student debt: an inter-professional economic analysis. *J Physiother*. 2018;64(3):183–191.
- [23] American Physical Therapy Association. Board of directors meeting minutes archive [Internet]. Alexandria (VA): American Physical Therapy Association; 2019c (2015 meeting minutes; July 13). [cited 2018 Nov 17]. Available from: <https://www.apta.org/BOD/Minutes/Archive/>
- [24] PT in Motion. APTA Board recommends further exploration of education reform through education leadership partnership [Internet]. PT in Motion News. Alexandria (VA): American Physical Therapy Association; 2015c [published 2017 Dec 11; cited 2019 Feb 2]. Available from: <https://www.apta.org/PTinMotion/News/2017/12/11/ClinicalEdBoardActions/>
- [25] American Physical Therapy Association. Median salary of the physical therapist [Internet]. Alexandria (VA): American Physical Therapy Association; 2019c. [cited January 2019]. Available from: <http://www.apta.org/WorkforceData/MedianSalary/PT/>
- [26] American Board of Physical Therapy Residency and Fellowship Education. Aggregate residency/fellowship program and applicant data: 2017 annual residency/fellowship report [Internet]. Alexandria (VA): American Physical Therapy Association; 2017 [cited 2019 Jun 7]. Available from: [http://www.abptrfe.org/uploadedFiles/ABPTRFEorg/For\\_Programs/News\\_and\\_Updates/2017AnnualResidencyFellowshipReport.pdf](http://www.abptrfe.org/uploadedFiles/ABPTRFEorg/For_Programs/News_and_Updates/2017AnnualResidencyFellowshipReport.pdf)
- [27] Hartley GW, Roach KE, Harrington KL, et al. Program-level factors influencing positive graduate outcomes of physical therapy residency programs. *Phys Ther*. 2019;99(2):173–182.